

CLAIMS

1. A light-emitting device having at least first and second light-emitting elements exhibiting different emission colors, each of the first and second light-emitting
5 element comprising:

a first electrode and a second electrode; and

a first layer, a second layer and a third layer which are formed between the first electrode and the second electrode,

wherein the first layer serves as a layer generating holes, the second layer
10 serves as a layer including a light-emitting layer, and the third layer serves as a layer generating electrons, and

wherein a thickness of the first layer of the first light-emitting element is different from that of the second light-emitting element.

15 2. A light-emitting device having at least first and second light-emitting elements exhibiting different emission colors, each of the first and second light-emitting element comprising:

a first electrode and a second electrode; and

a first layer, a second layer and a third layer which are formed between the first
20 electrode and the second electrode,

wherein the first layer serves as a layer generating holes, the second layer serves as a layer including a light-emitting layer, and the third layer serves as a layer generating electrons,

wherein a first layer is a layer in which an organic compound and a metal oxide
25 are mixed, and

wherein a thickness of the first layer of the first light-emitting element is different from that of the second light-emitting element.

3. The light-emitting device according to any one of claims 1 and 2, wherein
30 the thickness of the first layer of the first light-emitting element is different from that of

the second light-emitting element so that so that light-extraction efficiency of light emitted from the light-emitting layer and reflected light, which has been emitted from the light-emitting layer and is reflected on the first electrode, can be increased.

5 4. The light-emitting device according to claim 2, wherein the metal oxide is selected from the group consisting of molybdenum oxide, vanadium oxide and rhenium oxide.

10 5. The light-emitting device according to claim 2, wherein the organic compound is selected from the group consisting of 4, 4'-bis[N-(1-naphthyl)-N-phenylamino] biphenyl; 4,4'-bis[N-(3-methylphenyl)-N-phenylamino]biphenyl; 4,4',4''-tris(N,N-diphenylamino)triphenylamine; 4,4',4''-tris[N-(3-methylphenyl)-N-phenylamino]triphenylamine; 15 4,4'-bis{N-[4-(N,N-di-m-tolylamino)phenyl]-N-phenylamino}biphenyl; phthalocyanine; copper phthalocyanine; and vanadyl phthalocyanine.

20 6. A light-emitting device having at least first and second light-emitting elements exhibiting different emission colors, each of the first and second light-emitting elements comprising:

 a first electrode and a second electrode; and

 a first layer, a second layer, a third layer and a fourth layer which are formed between the first electrode and the second electrode,

25 wherein the first layer serves as a layer generating holes, the second layer serves as a layer including a light-emitting layer, the third layer serves as a layer generating electrons, and the fourth layer serves as a layer generating holes, and

 wherein a thickness of the first layer of the first light-emitting element is different from that of the second light-emitting element.

30 7. A light-emitting device having at least first and second light-emitting

elements exhibiting different emission colors, each of the light-emitting elements comprising:

a first electrode that has a non-light-transmitting property and a second electrode that has a light-transmitting property; and

5 a first layer, a second layer, a third layer and a fourth layer which are formed between the first electrode and the second electrode,

wherein the first layer serve as a layer generating holes, the second layer serves as a layer including a light-emitting layer, the third layer serves as a layer generating electrons, and the fourth layer serves as a layer generating holes, and

10 wherein a thickness of the first layer is different depending on each of the emission colors so that light-extraction efficiency of light emitted from the light-emitting layer and reflected light, which has been emitted from the light-emitting layer and is reflected on the first electrode, can be increased.

15 8. The light-emitting device according to any one of claims 1, 2, 6 and 7, wherein the second electrode comprises indium tin oxide including silicon oxide.

9. A light-emitting device comprising:

a plurality of transistors provided at interconnection portions formed by signal
20 lines and scanning lines;

a plurality of first electrodes that are connected to the plurality of transistors;

a second electrode provided to be opposed to the plurality of first electrodes;

a plurality of first layers, a plurality of second layers and a plurality of third layers which are formed between the plurality of first electrodes and the second
25 electrode;

wherein the plurality of first layers serve as layers generating holes, and the plurality of second layers serve as layers including any of light-emitting layers emitting first to third light, and the plurality of third layers serves as layers generating electrons, and

30 wherein thicknesses of the plurality of first layers are different depending on

each light-emitting element emitting the first to third light.

10. A light-emitting device comprising:

5 a plurality of transistors provided at interconnection portions formed by signal lines and scanning lines;

a plurality of first electrodes that are connected to the plurality of transistors;

a second electrode provided to be opposed to the plurality of first electrodes;

and

10 a plurality of first layers, a plurality of second layers and a plurality of third layers which are formed between the plurality of first electrodes and the second electrode,

wherein the plurality of first layers serve as layers generating holes, and the plurality of second layers each serve as a layer including at least one of light-emitting layers emitting first to third light, and the plurality of third layers serves as layers
15 generating electrons, and

wherein the plurality of first layers are each a layer in which an organic compound and a metal oxide are mixed, and

wherein thicknesses of the first layers are different depending on each light-emitting element emitting the first to third light.
20

11. The light-emitting device according to any one of claims 9 and 10, wherein the metal oxide is molybdenum oxide, vanadium oxide and rhenium oxide.

12. A light-emitting device comprising:

25 a plurality of transistors provided at interconnection portions formed by signal lines and scanning lines;

a plurality of first electrodes that are connected to the plurality of transistors;

a second electrode provided to be opposed to the plurality of first electrodes;

and

30 a plurality of first layers, a plurality of second layers, a plurality of third layers

and a plurality of fourth layers which are formed between the plurality of first electrodes and the second electrode,

wherein the plurality of first layers serve as layers generating holes, and the plurality of second layers serve as a layer including at least one of light-emitting layers emitting first to third light, the plurality of third layers serve as layers generating electrons, the plurality of fourth layers serve layers generating holes, and

wherein thicknesses of the plurality of first layers are different depending on each light-emitting element emitting the first to third light.

10 13. The light-emitting device according to claim 12, wherein thicknesses of the plurality of first layers are different depending on each light-emitting element emitting the first to third light so that light-extraction efficiency of light emitted from the light-emitting layer and reflected light, which has been emitted from the light-emitting layer and is reflected on the first electrode, can be increased.

15 14. The light-emitting device according to any one of claims 9, 10 and 12, wherein the organic compound is selected from the group consisting of 4, 4'-bis[N-(1-naphthyl)-N-phenylamino] biphenyl; 4,4'-bis[N-(3-methylphenyl)-N-phenylamino]biphenyl; 20 4,4',4''-tris(N,N-diphenylamino)triphenylamine; 4,4',4''-tris[N-(3-methylphenyl)-N-phenylamino]triphenylamine; 4,4'-bis{N-[4-(N,N-di-m-tolylamino)phenyl]-N-phenylamino}biphenyl; phthalocyanine; copper phthalocyanine; and vanadyl phthalocyanine.

25 15. The light-emitting device according to any one of claims 9, 10 and 12, wherein the second electrode comprises indium tin oxide including silicon oxide.

16. A light-emitting device comprising:
a plurality of types of color filters having different optical characteristics;
30 a first electrode and a second electrode; and

a first layer, a second layer and a third layer formed between the first electrode and the second electrode,

wherein any of the first to third layers has an organic material and a metal oxide, and

5 wherein a thickness of the layer having the organic material and the metal oxide is different depending on each of the optical characteristics.

17. A light-emitting device comprising:

a plurality of types of color filters having different optical characteristics;

10 a first electrode and a second electrode; and

a first layer, a second layer and a third layer formed between the first electrode and the second electrode,

wherein the first layer serves as a layer generating holes, and the second layer serves as a layer including a light-emitting layer, and the third layer serves as a layer
15 generating electrons,

wherein the first layer has an organic material and a metal oxide, and

wherein a thickness of the first layer is different depending on each of the optical characteristics.

20 18. A light-emitting device comprising:

a semiconductor film;

a first electrode and a second electrode formed over the semiconductor film;

a first layer, a second layer and a third layer formed between the first electrode and the second electrode,

25 a plurality of types of color filters having different optical characteristics, which are formed on the first electrode side,

wherein the first electrode has a light-transmitting property,

wherein the first layer serves as a layer generating holes, and the second layer serves as a layer including a light-emitting layer, and the third layer serves as a layer
30 generating electrons,

wherein the first layer has an organic material and a metal oxide, and
wherein a thickness of the first layer is different depending on each of the
optical characteristics.

- 5 19. A light-emitting device comprising:
a semiconductor film;
a first electrode and a second electrode formed over the semiconductor film;
a first layer, a second layer and a third layer formed between the first electrode
and the second electrode,
10 a plurality of types of color filters having different optical characteristics,
which are each formed on the first electrode side,
wherein the second electrode has a light-transmitting property,
wherein the first layer serves as a layer generating holes, and the second layer
serves as a layer including a light-emitting layer, and the third layer serves as a layer
15 generating electrons;
wherein the first layer has an organic material and a metal oxide; and
wherein a thickness of the first layer is different depending on each of the
optical characteristics.
- 20 20. The light-emitting device according to any one of claims 16 to 19, wherein
the plurality of types of color filters are formed on an emission side.
21. The light-emitting device according to any one of claims 16 to 19, wherein
the metal oxide is selected from the group consisting of molybdenum oxide, vanadium
25 oxide and rhenium oxide.
22. The light-emitting device according to any one of claims 16 to 19, wherein
at least one of the first and second electrodes comprises indium tin oxide including
silicon oxide.